The effect of trade liberalization on exports, imports and balance of payment: the case of Sub-Saharan Africa

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Abstract

We explore dynamic non-stationarity panel data estimators namely, mean group (MG) and pooled mean group (PMG) for investigating the extent to which trade policies such as trade liberalisation and tariff rates matter to trade performance using the case of Sub-Saharan Africa (SSA). We found that increasing tariffs has the potential of particularly worsening export growth in SSA but increasing openness via liberalisation policy is likely to spur decline in the import dependence of the SSA economy. Thus, we concluded that while trade liberalisation seems to exhibit no significant impact on export growth in SSA, the same policy may yet be explored to encourage decline in the region's import activities, particularly those import activities that might threaten the growth of domestic industries.

Keywords: trade liberalization, export growth, import growth, balance of payment, tariffs rate, mean group, pooled mean group, Sub-Saharan Africa.

JEL Classification: C23, F13, F14, O55.

1. Introduction

Achieving rapid, sustainable and pro-poor economic growth and development through trade channel is often stressed as a development policy objective in all economies including countries in the Sub-Saharan Africa (SSA). After realising the importance of trade policies in boosting economic performance, a reasonable number of the SSA countries (particularly after attaining political independence in the 1960s and 1970s) adopted different forms of interventionist policies for protecting their domestic markets from foreign competition. These policies were restrictive and perceived as feasible approaches to achieving structural transformation and a way of reducing the region's dependence on primary commodities. However, the 1979 oil price shock coupled with debt crises and global recession of the early 1980s tended to signal the failure of trade restriction policies such as import-substitution, with majority of the SSA countries left in economic doldrums. Consequently, a new consensus emerged on the importance of trade liberalisation as catalyst of international trade performance.

The latter development centred on openness of trade activities across borders and saw most SSA countries witnessing the formulation and implementation of trade liberalisation policy within the context of structural adjustment programme (SAP) framework, with the support of the IMF and World Bank in the mid-1980s. Commencing from the mid-1980s, most SSA tended to favour trade liberalisation policy with many countries significantly reducing trade barriers (i.e. restriction on imports). By implication, tariffs reduction and non-tariffs barriers were meant to ease importation process on the one hand and encourage export by eliminating export taxes and providing export intensive, on the other hand.

The liberalisation of trade has been strongly advocated as a means of accelerating economic development. The prevailing opinion in extant literature is that expanded trade leads to prosperity. Supporting this position is the widespread assertion that barrier to trade or anti-export bias is likely to reduce export growth below potential. In the same manner, an import control measure is likely to reduce efficiency, yet it matters for protecting the balance of payments (see Santos-Paulino & Thirlwall, 2004). There is the widespread assertion that trade liberalisation will raise the growth of exports and imports but the implications for the balance of payments remain uncertain because this depends on the relative impact of such liberalisation on export and import growth as well as on what happens to the prices of traded goods.

In other words, while it is definite that trade liberalisation has the potential for enhancing growth particularly from the supply-side; it must be stated that where the balance of payments is unfavourable, growth in that perspective might be adversely affected from the demand side. This, according to Khan & Zahler (1985), is due to the fact that balance of payment deficits resulting

from trade liberalisation are mostly unstoppable and often difficult to rectify particularly by relative prices (real exchange rate) changes. Overall, despite the proliferation of literature on the probable impact of trade liberalisation on export growth, import growth and balance of payment (see Chaudhary & Amin, 2012; Parikh, 2006; Pacheco-López, 2005; Santos-Paulino & Thirlwall, 2004), there has not been any definitive conclusion on the issue. For some, there is positive association between trade liberalisation and various indicators of trade performance such as export growth, import growth and trade balance. Others have also argued that openness of trade does not imply increasing growth of these fundamentals.

It is instructive that the inconsistency in the literature may be due to differences in the environmental conditions such as degree of commitment to trade liberalisation which tends to vary for developing compared to developed nations. Motivated by relatively lesser degree of economic integration which is typical of developing economies; this study uses the case of SSA to contribute to the literature on trade liberalisation in two-fold: First, it explores both the static and dynamic approaches to understanding the extent to which trade liberalisation matters for the SSA trade performance. Second, it examines the importance of trade liberalisation in the context of SSA not only from the demand perspective but from the supply perspective. The choice of SSA is particularly motivated by the poor showing of the region's participation in the world trade which is probably connected to the fact that export trade in SSA is dominated by primary commodities, which, by nature, are extremely vulnerable to unstable weather conditions, world demand and prices.

Following this introductory section, the rest of the paper is structured as follows: Section 2 provides some stylized facts on trade policy reforms in SSA with particular focus on trends in export growth and import in pre–post trade liberalisation periods. Section 3 dwells on the findings of previous studies. Data description and preliminary analyses are presented in Section 4. Section 5 model specifications with empirical results presented and the Conclusion is presented in section 6.

2. Some stylized facts on trade policy and trade performance in SSA

Due to the perceived failure of the import–substitution trade policy as well as the debt crisis in the early 1980s, there emerged the new global consensus on the importance of trade liberalisation as catalyst to favourable trade performance. This subscription to openness of trade activities across boarder saw most SSA countries witnessing the formulation and implementation of trade liberalisation policy within the context of structural adjustment programme (SAP) framework, with the support of the IMF and World Bank in the mid-1980s. Thus, tariffs in this context became the main trade policy of most SSA countries.

Other anti-export bias measures were equally adopted to boost manufacturing export performance in most of the SSA countries. Mali and Ghana, for example, either abolished export levies and duties on most exports or had no export quotas or voluntary export restraints. Uganda replaced its export licensing requirements with a less restrictive export certification system in 1990 and also abolished export taxes. Botswana followed the same trend by not requiring exportation permits and so were significant reductions in the effective rates of protection in SSA countries such as Nigeria, Kenya, South Africa, Mali, Zimbabwe and Cote d'Ivoire. Where some level of export prohibitions still existed, it was been argued that they were necessary to ensure required standard so that quality is not compromised for both health and environmental reasons.

Export Processing Zones (EPZs) are a product of the Free Zones Act enacted in the Gambia. They were also adopted by government in some of the SSA countries. Mali, for example, created free trade zones as part of measures to boosting manufacturing export performance. The bulk of manufacturing exports in Mauritius (dominated by textiles and clothing) are also done via the export processing zones enterprises. However, the liberalisation of trade policy in SSA seems not to be limited to the reduction or abolishment of tariffs and related trade protection policies mentioned above. Rather, exchange rate regimes in most of the SSA countries were also liberalised. Many SSA countries have long stopped fixing exchange rates and overvaluing their currencies to stimulate exports and make the economy more competitive.

Table 1: Average Exports& Imports Growth before and after liberalisation in SSA

	Export Growth (%)				*Import Growth (%)*		
Country	***Lib Year***	***Pre-Lib***	***Post-Lib***	***Remarks***	***Pre-Lib***	***Post-Lib***	***Remarks***
Benin	1989	-1.69	9.83	Increase	-2.48	6.51	Increase
Botswana	1994	8.80	5.21	Decrease	5.70	6.03	Increase
Burkina Faso	1991	1.49	8.65	Increase	1.78	6.82	Increase
Cameroon	1989	10.41	2.62	Decrease	7.79	5.78	Decrease
DR. Congo	2001	5.92	11.33	Increase	7.28	15.99	Decrease
Gabon	1994	5.28	0.24	Decrease	3.33	2.76	Decrease
Kenya	1993	4.17	3.98	Decrease	0.81	8.58	Increase
Lesotho	1994	20.78	11.82	Decrease	18.17	7.61	Decrease
Madagascar	1988	-4.96	7.37	Increase	-8.78	6.66	Increase
Mali	1998	1.83	6.47	Increase	4.11	11.80	Increase
Namibia	1994	1.53	3.18	Increase	1.19	6.78	Increase
Nigeria	1986	-4.77	6.58	Increase	-21.09	5.15	Increase
Rwanda	1995	-0.90	16.00	Increase	10.80	10.96	Increase
Senegal	1986	3.45	2.05	Decrease	5.35	3.87	Decrease
Sierra Leone	1989	-6.09	13.61	Increase	-9.84	12.42	Increase
South Africa	1994	2.04	3.15	Increase	2.64	5.44	Increase
Togo	1994	0.90	6.45	Increase	-3.13	8.50	Increase
Uganda	1987	-2.04	10.05	Increase	0.94	7.21	Increase
Zambia	1991	-3.36	22.36	Increase	-2.59	20.69	Increase

Sources: The liberalisation (Lib) year or start date is based on WTO policy reviews for various countries; while the increase or decrease values are the author's calculations

A look at Table 1 shows that in thirteen (13) of the twenty (19) SSA countries, export growth appeared to increase after the implementation of trade liberalisation policy but decreased in six (6) countries. However, it is observed that import growth increased in about fourteen (14) of the SSA countries in the post liberalisation period; and only decreased in five (5) of the countries. Botswana's case appears interesting because the post liberalisation seems to be causing decrease in export growth on the one hand, and increase import growth, on the other hand. These pre-estimation results remain merely descriptive and not sufficient to draw inference on the extent to which the liberalisation policy matters for export growth–import growth in the SSA. To determine such empirical evidence requires specification and estimation of model as demonstrated in the following:

3. Review of literature

Extant studies on the links between trade liberalisation and trade performance via export growth, import growth and balance of payment can be classified into two main parts: country specific studies and cross-country analyses (see Jayanthakumaran, 2011; Allaro, 2012; Atif et al., 2012; Bas, 2013; Paudel, 2014; Mitral et al., 2014; Odongo, 2015). However, in view of recent switch from protective to trade liberalisation policies; researchers focusing on developing economy particularly Africa tend to favour the cross-country approach in their evaluation of the impact of trade openness on export growth of developing regions. However, similar to empirical findings on the basis of country specific studies, the view that trade liberalisation enhances export performance is still empirically far from being resolved even on the basis of cross-country analysis. While studies by Weiss (1992); Arthukorala (2011); Bas (2013); Paudel (2014) are among the few that report positive and strong relationship, Santos-Paulino (2002), Ackah and Morrisey (2005), Fernades (2007), Babatunde (2009), Ghani (2011), and Ratnaike (2012), among others, are of the view that there is no significant relationship or that the relationship is negative, in some instances.

Recently, Stojcic et al. (2018) explored the effects of trade liberalisation with European Union (EU) on changes in the structure and quality of exports from NMS from 1990 to 2015. Results obtained using synthetic control method (SCM) showed that the timing of trade liberalisation with the European Union shaped the evolution of export performance, structure and quality of exports from NMS. Osakwe et al. (2018) explored the relationship of trade, trade liberalisation, and exports diversification in developing and Sub-Saharan African (SSA) countries. Findings from their non-parametric analyses indicated that developing countries that were more open to trade (based on trade intensity) tended to have more diversified exports structures than those classified as less open (see Fan et al., 2019) for the case of China.

There is paucity of studies focusing on the relationship between trade liberalisation and imports (see Melo & Vogt, 1984; Bertola & Faini, 1990; Faini et al., 1992; Santos-Paulino, 2002, 2007). Melo and Vogt (1984) proposed two hypotheses regarding the probable impacts of trade liberalisation on import performance or import elasticities. On the one hand, they hypothesised that the income elasticity of demand increases as the degree of import liberalisation increases while their second hypothesis predicted that as economic development continues, the price elasticity of import demand rises owing to progress in import substitution. Santos-Paulino (2002), using the case of Venezuela provides support for the two hypotheses contrary to Boylan and Cuddy (1987) whose findings rejected the hypothesis in an investigation of the elasticities of import demand in Ireland. Mah (1999) found that income elasticity of demand increased as a result of import liberalisation in Thailand, but price elasticity did not rise. Hoque and Yusop (2012) examined the impact of trade liberalisation on the aggregate import in Bangladesh using the ARDL Bounds Test approach. Findings from the study suggested that trade liberalisation through reduction of the import duty rate substantially increased the aggregate import on the short run, but insignificantly on the long run.

So far, studies that either focus on the economic implications of trade liberalisation from export perspective or from import perspective, respectively have been considered. Some extant studies mainly focused on the impact of trade liberalisation of balance of payment and balance of trade (see Kaur and Makkar, 2016; Allaro, 2012, Parikh; 2007) for India, Ethiopia, and select developing countries, respectively. Essentially, only few extant studies have jointly considered the impact of trade liberalisation on both export and import (see Sofjan, 2017). Studies closely related to the present study include Acheco-López (2015), Chaudhary and Amin (2012), and are Santos-Paulino and Thirlwall (2004) and they all considered the trade performance implication of trade policies not only on export and import but also on balance of payment or balance of trade. Despite these efforts, there is a serious dearth of empirical studies on the relationship between trade liberalisation and trade performance in SSA. None of the previous studies focusing on SSA (i.e. Babatunde, 2009, Babatunde & Olofin, 2007), appears to have jointly considered all these three measures of trade performance indicators. The data for this study were sourced from World Bank Development Indicator (WDI) and World Trade Organization (WTO).

4. Model and data

4.1 Data description and source

The motivation for focusing on nineteen (19) select SSA countries is predicated on the availability of data covering the period between 1980 and 2018.The key variables of interest in this study are export growth (XPT) measured as log of total export of goods and services, import

growth (MPT) measured as log of total import of goods and services as a percentage of GDP, and balance of payment (BOP) as a ratio of GDP. The trade policy is measured both from the perspectives of trade openness via liberalisation (LIB) and trade restriction via tariffs. Although average duties applied to exports and imports are often explored in the literature in the case of trade restriction, due to paucity of data, a tariff rate (TRF) measured as weighted mean applied to all products (%) is considered in the context of this study. Second, this study applied a dummy variable which took the value of one when uninterrupted trade reforms began in an SSA country and zero beforehand. On the one hand, the tariffs variable captures the direct impact of trade tariffs on the trade performance indicators under consideration, while the liberalisation dummy, on the other hand, captures the effects of non-tariff barriers. The liberalisation dates are constructed from a careful examination of the trade policy reviews of SSA countries. Other variables considered are domestic income growth, foreign income growth and a measure of price competitiveness using real exchange rate.

4.2 Model specification

4.2.1 Export growth model

Starting with a standard export demand function in which exports are considered a function of the real exchange rate and world income, the study assumed a constant price and income elasticities such that; the export demand function can be expressed below as:

$$X_t = A(EP_{ex} / P_{im}^*)_t^{\eta} W_t^{\lambda} \quad (1)$$

where X_t is the level of exports at time *t*, A is a constant; E is nominal exchange rate measure as the foreign price of domestic currency while P_{ex} / P_{im}^* is the ratio of domestic export prices to foreign import prices such that, the real exchange rate (RER) is measured as $\left[EP_{ex} / P_{im}^* \right]$[1]. The term W is the level of world income, while a decrease in the foreign price of domestic currency (devaluation) or a fall in export prices relative to import prices should reduce RER and hence, increase export growth such that the expected sign for the price elasticity of demand for export (η) is negative, but positive for income elasticity of demand for exports (λ). Taking logs and differentiating with respect to time gives:

$$x_t = \alpha + \eta(e + p_{ex} - p_{im}^*) + \lambda\left(w_t\right) \quad (2)$$

The conventional export growth function in equation (2) provides a useful framework for the empirical analysis of the responsiveness of export to real exchange rate (RER) via relative price

[1]The real exchange rate is defined this way as we are interested in the relative price of tradable goods only

of tradable goods and world income growth, respectively (*WYG*). Equation (2) can be re-represented in a panel thus:

$$xpg_{it} = \delta_i + \beta_1 rer_{it} + \beta_2 wyg_{it} + \varepsilon_{it} \quad (3)$$

where xpg is real export growth, δ_i is country –specific effect, rer is real exchange rate, wyg is growth rate of world real income, while ε_{it} is the idiosyncratic error term. Also, $\beta_1 \& \beta_2$ denotes the price and income elasticity of demand for exports, respectively.

To capture the role trade liberalisation in the export growth model, equation (3) is extended to include two measures of trade policies both from the perspectives of trade openness and trade restriction as follows:

$$xpg_{it} = \delta_i + \beta_1 rer_{it} + \beta_2 wyg_{it} + \beta_3 lib_{it} + \beta_4 trf_{it} + \varepsilon_{it} \quad (4)$$

where *lib* is the liberalisation dummy which takes the value of 1 from the year significant trade reforms commence in an SSA country and zero beforehand. Since trade liberalisation is expected to reduce the degree of anti-export bias, the coefficient on *lib* is expected to have a positive impact on real export growth. The term *trf* represents tariff rate and since it is a trade restrictive measure, the coefficient on *trf* is expected to be negative.

4.2.2 Import growth model

One of the assumed common effects of trade liberalisation, particularly in developing countries, is that it increases imports more than exports (Santos-Paulino & Thirlwall, 2004). To this end, import growth analysis as to comparatively determine the extent to which this holds for the case of SSA. Similar to the export growth approach, this study considered a standard import demand function, where imports are assumed to be a function of price competitiveness measured by the real exchange rate and domestic income. Hence, assuming that the price and income elasticities of demand for imports are constant, the panel model specification of the function can be written as follows:

$$mpg_{it} = \delta_i + \beta_1 rer_{it} + \beta_2 dyg_{it} + \varepsilon_{it} \quad (5)$$

where mpg represents real import growth, δ_i is country–specific effect, rer is real exchange rate, while dyg is growth rate of domestic real income with ε_{it} remaining as earlier defined. Consequently, $\beta_1 \& \beta_2$ denotes the price and income elasticity of demand for imports, respectively.

Similar to the export growth model, equation (5) is further modified to include dummy for trade liberalisation and import duties, respectively.

$$mpg_{it} = \delta_i + \beta_1 rer_{it} + \beta_2 dyg_{it} + \beta_3 lib_{it} + \beta_4 trf_{it} + \varepsilon_{it} \quad (6)$$

while all variables remained as earlier defined, the import duties represented via tariffs rate is also expected to impact import growth negatively.

4.2.3 Balance of payment model

The current account offers a good platform of a country's position regarding foreign exchange and foreign reserves. Thus, to capture the extent to which trade liberalisation matters for the difference between exports and imports, we follow the Santos-Paulino and Thrilwall (2004) approach which specified a balance of payment (BOP) as a function of income, price, and term of trade.

$$bop_{it} = \delta_i + \beta_1 rer_{it} + \beta_2 wyg_{it} + \beta_3 dyg_{it} + \beta_4 tot_{it} + \varepsilon_{it} \quad (7)$$

where bop representing balance of payment growth is measured as current account balance of payment as ratio of GDP, while other variables remain as earlier defined but *tot* denoting term of trade to control changes in the price of exports and imports which has the potential to automatically affect the monetary value of trade flows. In line with the third objective of this study, the balance of payment growth equation is further adjusted to reflect trade liberalisation as follows:

$$bop_{it} = \delta_i + \beta_1 rer_{it} + \beta_2 wyg_{it} + \beta_3 dyg_{it} + \beta_4 tot_{it} + \beta_4 lib_{it} + \beta_5 trf_{it} + \varepsilon_{it} \quad (8)$$

However, the effect of trade liberalisation on account of the balance of payments is theoretically ambiguous irrespective of the framework of balance of payments analysis used (Thirlwall and Gibson, 1992). Therefore, the effects could be positive or negative.

4.3 Estimation technique and procedure

The hypothesised empirical nexus between trade liberalisation and the respective trade performance indicators under consideration namely, export growth (*xpg*); import growth (*mpg*); and balance of payment (*bop*) can be estimated using the conventional static panel estimation techniques namely, Pooled OLS, Fixed Effects and Random Effects panel estimation techniques. However, the Pool OLS is said to be highly restrictive given the heterogeneity consequence of its assumption of common intercept and slope coefficient for all cross-sections. For the fixed effect, the estimator assumes common slopes and variance but country specific, and therefore, tends to suffer from problems of loss of degree of freedom (Baltagi, 2008). In contrast to fixed effects

model, the random effects is regarded as less problematic in terms of degrees of freedom since it assumes common intercepts. This notwithstanding, the random effects assumption of time invariants is considered to be strict exogeneity as it implies that the error at any period is uncorrelated with the past; present and future (see Loayza and Ranciere, 2002).

However, while some of the aforementioned limitations associated with static panel estimators Generalized Method of Moments (GMM) Estimator, the empirical analysis in the context of this study requires an estimation technique that is suitable for the probable non-stationarity feature of the variables as expected of panel data with large time series dimension. In other words, this paper explores the mean-group (MG) and pooled mean-group for its non-stationary dynamic panels in which the parameters will be assumed heterogeneous across groups.These techniques are appropriate in this case due to the large cross-sectional (N) and large time-series (T) dimensions of the variables. Pesaran et al. (1997, 1999), among others, have demonstrated that the assumption of homogeneity of slope parameters is often inappropriate when dealing with large N and large T.

More worrisome is the fact that ignoring the slope parameter heterogeneity when, in fact, it exists may produce inconsistent and potentially misleading results. However, the MG estimator of Pesaran and Smith (1995) and the pooled mean group (PMG) estimator of Pesaran, Shin, and Smith (1997, 1999) have been developed to capturing any inherent slope heterogeneity in the panel data model and any potential bias that may result from using the traditional methods. Essentially, the MG involves estimating N time-series regressions and averaging the coefficients, whereas the PMG estimator requires a combination of pooling and averaging of coefficients.

The implementation of the MG and PMG involves the following procedure.[2] Consider an autoregressive distributive lag (ARDL) model, for instance:

$$y_{it} = \sum_{j=1}^{p} \rho_{ij} y_{i,t-j} + \sum_{j=0}^{q} \gamma'_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \;;\; (p, q_1, \ldots, q_k) \qquad (9)$$

Where, representing each of the trade performance indicators, namely, *xpg*, *mpg* and *bop* to be considered individually such that X_{it} is a $k \times 1$ vector of explanatory variables depending on which model is under consideration. γ_{it} is a $1 \times k$ vector of coefficients and ρ_{ij} are scalars. If y and X are non-stationary (i.e. I (1)) and are cointegrated, then, the error term is stationary (i.e. I (0) process) for all i. Thus, equation (9) can be reparameterised into the error correction

[2] A detailed computational procedure can be obtained from Pesaran and Smith (1995) and Pesaran, Shin, and Smith (1997, 1999)

equation which captures the short-run dynamics and the deviation from the long run equilibrium. The error correction equation can be expressed as:

$$\Delta y_{it} = \sum_{j=1}^{p-1} \rho_{ij}^{*} y_{i,t-j} + \sum_{j=0}^{q-1} \gamma_{ij}^{\prime *} \Delta X_{i,t-j} + \alpha_i \left(y_{i,t-1} - \beta_i^{\prime} X_{i,t-1} \right) + \mu_i + \varepsilon_{it}; \qquad (10)$$

where $\alpha_i = -\left(1 - \sum_{j=1}^{p} \rho_{ij}\right)$ is the error correction parameter that measures the speed of adjustment to long equilibrium; $\beta_i = \sum_{j=0}^{q} \lambda_{ij} \Big/ \left(1 - \sum_k \rho_{ik}\right)$ is the long run estimates; and $\rho_{ij}^{*} = -\sum_{r=j+1}^{p} \rho_{ir} \ \left(j = 1, \ldots, p-1\right)$; and $\lambda_{ij}^{*} = -\sum_{r=j+1}^{q} \lambda_{ir} \ \left(j = 1, \ldots, q-1\right)$ are the short run estimates. Also, ρ_i is $\mathrm{IID}\left(0, \sigma_{\rho}^{2}\right)$ and λ_i is $\mathrm{IID}\left(0, \sigma_{\lambda}^{2}\right)$ and these parameters are independent of y_{is}, X_{is} and ε_{is}. For cointegrated series, α_i is expected to be significantly negative indicating that there is long run equilibrium between/among the variables. In essence, if α_i is not significant, it does suggest that $\alpha_i = 0$ and therefore, there is no long run relationship.

In order to obtain consistent estimates of the mean values of β_i and λ_i, Pesaran and Smith (1995) presented four different estimation procedures when using the MG estimator: (i) aggregate time series regressions of group averages; (ii) cross-section regressions of averages over time; (iii) pooled regressions allowing for fixed or random intercepts; or (iv) separate regressions for each group, where coefficients estimates are averaged over these groups (see also Baltagi, 2008). Having satisfied these procedures, the MG estimator, for instance, ensures that the intercepts, slope coefficients, and error variances are all allowed to differ across groups. However, the difference between the MG estimator and the PMG estimator lies in the way the long run coefficients are treated. Unlike the MG estimator, the PMG estimator constrains the long-run coefficients to be equal across groups (as in the case of FE estimator) although the intermediate estimator still allows the intercept, short-run coefficients, and error variances to differ across the groups (as in the case of MG estimator).

To determine the most appropriate and efficient among these two competing estimators, the Hausman test is usually employed. According to the null hypothesis of this experiment, the PMG estimator is the efficient estimator under the null hypothesis for PMG against MG since the test is a pairwise test and only two estimators can be only compared at a time. Hence, a non-rejection of the null hypothesis implies the adoption of the PMG estimator while the rejection indicates the adoption of the MG estimator.

5. Empirical presentation and result discussion

The suitability or appropriateness of the dynamic heterogenous panel data model, as earlier established, is mainly informed by the probable presence of unit root or non-stationarity feature of the variables under consideration. To this end, this study commences the presentation and discussion of the empirical results with unit root results. For consistency and robustness, this study considered three different classes of panel unit root tests. As shown in Table 2, the first category of panel unit root test considered assumed or hypothesized unit root with common process (Harris and Tzavalis, 1999 [HT rho]; Breitung, 2000; Levin et al., 2002 [LLC] tests). The second category including Im et al. (2003), Maddala and Wu (1999) assumed unit root with individual unit root process, while the null hypothesis for the third category also assumed no unit root with common unit root process (i.e. Hadri, 2000 Lagrange Multiplier test).

Based on their individual hypotheses and test regressions, these tests have been categorized into stationary (the third category) and nonstationary (the first and second category) tests. Starting with the trade performance indicators, a look at table 2 seems to be suggesting that the null hypothesis of unit root holds for export growth and import growth both in the first and second categories of panel unit tests considered. Confirming this result is the rejection of the null hypothesis of stationarity in the case of Hadri test. However, for the balance of payment (BOP) variable, the null hypothesis of unit root appears to be rejected both in the first and second categories of panel unit root, with the only exception being the case of the Hadri test where the null hypothesis of stationarity seems to be rejected as level.

Table 2: Panel unit root test result

	The null hypothesis for different test methods					
	Unit root with common process			***Unit root with individual unit root process***		***No unit root with common unit root process***
Variable	**LLC**	**Breitung**	**HT**	**IPS**	**ADF Fisher**	**Hadri**
XPG	-13.943***[b]	-10.715***[b]	-9.819***[b]	-15.122***[b]	-4.414***[a]	-2.038[b]
MPG	-10.804***[b]	-9.199***[b]	-3.928***[b]	-14.250***[b]	-4.238***[a]	-3.796[b]
BOP	-3.754***[a]	-6.715***[a]	-0.208***[b]	-5.965***[a]	-2.896***[b]	-3.086[b]
WYG	-6.560***[a]	-12.148***[b]	-3.041***[b]	-9.438***[b]	-1.771***[b]	-4.973[b]
DYG	-7.092***[b]	-7.308***[b]	-3.242***[b]	-12.565***[b]	-2.064**[b]	-4.604[b]
RER	-5.166***[b]	-3.102***[b]	-0.436***[b]	-8.511***[a]	-1.366***[a]	-8.031[b]
TRF	-1.679**[a]	-9.423***[b]	-8.270***[a]	-3.326***[a]	-4.445***[b]	-6.914[b]
TOT	-8.859***[b]	-5.163***[b]	-0.012***[a]	-7.190***[a]	-2.771***[a]	-3.435[a]

Note: *a* and *b denote* stationarity at level and at first difference, respectively, while ***, **, * indicate statistical significance at 1%, 5% and 10% respectively. Also, the numeric subscript 1&2 is meant to differentiate consumer discretionary sector from consumer staple sector. All the series are expressed in returns, for instance, $r_t = \log(z_t / z_t(-1))$ where *z* represents a particular variable under consideration

For the tariffs and other determinants of trade performance under consideration, our finding suggested there is significant presence of unit root in WYG and DYG. The result is however

[otherwise for the tariffs variable (TRF)] but mixed for RER and TOT, respectively. On the whole, the unit root and stationarity test results reported in table 2 predominantly hovered around I(0) and I(1) orders of cointegration thus validating the appropriateness of our choice of panel model (i.e. ARDL Panel Model), which allows for the combination of variables of different order of integration in the same modelling framework.

On the main empirical results, while the reported estimates in Tables 3&4 including those obtained from MG and PMG estimators, respectively, but inference will only be drawn from the preferred estimator. However, this choice of preferred estimator between the two alternatives under consideration (i.e. MG and PMG) is informed by the outcome of the Hausman test results. Starting with the empirical results from the baseline model where only the conventional determinants of trade performance are considered, a look at Table 3 shows that the Hausman test indicated the PMG as the sufficient estimator both for export growth and import growth models as well as BOP model.

Having determined the preferred estimator across the different sectors under consideration; this study proceeded to exploring the short and long run effects of Reer, REER, WYG, DYG and TOT, respectively on export growth, import growth and bop model. This study found a significant income elasticity of demand for exports at 1.12 thus suggesting that a change in world income will cause a marginally higher change in the demand for SSA exports. This evidence, however, appears to be only viable on the short run, because, on the long run, neither REER nor WYG exhibits any significant potential of enhancing export growth in SSA. As expected of import dependent economies, this study found significant evidence of income elasticities of demand for import at 0.38 and 1.28 on the long and short run, respectively.

In the case of balance of payment model, in addition to relative prices in terms of real exchange rate in this case, this study controlled for both domestic and world income as well as terms of trade. The finding was particularly similar to that of Santos-Paulino &Thirlwall (2004) which found that the world income growth has a significant positive effect (as expected) on balance of payment on the one hand, while domestic income growth, on the other hand, has a significant and expected negative effect. For relative price changes, the findings of this study showed that it tended to worsen the trade balance which also conformed to a number of previous findings, while the TOT in the context of this study exhibited no significance on BOP.

Table 3: Empirical results on trade performance without the role of trade liberalisation

Long run coefficient	Export Growth Model		Import Growth Model		BOP Model	
	MG	**PMG**	**MG**	**PMG**	**MG**	**PMG**
RER	-0.197 (0.405)	0.0129 (0.0190)	-0.0608 (0.146)	0.0529 (0.0359)	1.791 (2.799)	-2.025*** (0.622)
DYG			-0.151 (0.685)	0.381*** (0.135)	-37.41 (24.51)	-5.884*** (1.281)
WYG	1.933 (2.206)	-0.243 (0.722)			-15.27 (33.95)	-18.05 (12.54)
TOT					-5.101 (4.299)	-0.881 (0.977)
Short run coefficient						
ΔRER	0.0470 (0.0363)	0.0493 (0.0432)	-0.0269 (0.0365)	-0.0549 (0.0363)	-0.148 (3.326)	0.118 (2.602)
ΔDYG			1.284*** (0.383)	1.283*** (0.261)	18.40 (11.20)	-0.494 (8.719)
ΔWYG	0.537 (0.602)	1.233*** (0.362)			26.04 (20.13)	26.13* (15.17)
ΔTOT					7.890 (6.045)	4.228 (5.498)
$\hat{\xi}_{t-1}$	-0.372*** (0.0606)	-0.295*** (0.0484)	-0.371*** (0.0511)	-0.242*** (0.0401)	-0.716*** (0.0544)	-0.482*** (0.0513)
Constant	-7.710 (9.013)	3.259*** (0.544)	-0.151 (0.685)	0.381*** (0.135)	299.9 (400.7)	175.9*** (18.55)
Hausman test (χ_k^2)	3.00 (0.2331)		0.56 (0.7557)		2.17 (0.7044)	
No. Observation	702	702	702	702	640	640

Note: The null hypothesis for Hausman test is that the PMG estimator is the efficient estimator while the MG estimator is the efficient estimator under the alternative hypothesis. The value in parenthesis is standard error for the coefficients but p-value for Hausman test, while ***, ** and * denotes 1%, 5% and 10% levels of significance.

By extending the empirical analysis to including the role of trade policies such as trade liberalisation and tariffs rate, the empirical estimates in Table 4 seems to suggest that in addition to world income growth, trade restriction and not trade liberalisation appears to be another significant determinant of export growth in Africa. While this study found no significant influence of the period after the introduction of liberalisation policy on the export growth of SSA, for instance, it however, found potential negative impact of tariffs rate on the region's export growth. This study equally found a potential benefit of trade liberalisation on the import growth of SSA. Prior trade liberalisation period, for instance, import growth in SSA was 1.92% but seemed to have been declining since the introduction of liberalisation to about 1.78% on the long run and 1.70% on the short run. However, neither trade via liberalisation nor tariffs rate exhibited any statistically significant impact on the SSA balance of payment

Table 4: Empirical results on trade performance with the role of trade liberalization

Long run coefficient	Export Growth Model		Import Growth Model		BOP Model	
	MG	**PMG**	**MG**	**PMG**	**MG**	**PMG**
RER	0.212	0.0306	-0.416	0.0413	3.060	-2.558***
	(0.398)	(0.0219)	(0.343)	(0.0392)	(3.111)	(0.675)
DYG			-0.802	-0.242	-37.90	-6.129***
			(1.070)	(0.257)	(27.19)	(1.353)
WYG	0.693	-0.165			7.625	-28.65**
	(1.805)	(0.681)			(30.04)	(12.06)
TOT					-5.810	-1.032
					(5.475)	(0.902)
TRF	-0.0163	-0.0106**	-0.0196	-0.00424	0.0106	0.0111
	(0.0683)	(0.00492)	(0.0651)	(0.00804)	(0.903)	(0.0831)
LIB	-0.786	0.0225	0.0659	-0.143*	-0.797	0.637
	(0.720)	(0.0415)	(0.191)	(0.0816)	(2.248)	(1.017)
Short run coefficient						
ΔRER	0.0879*	0.0499	-0.00761	-0.00768	1.583	2.611
	(0.0471)	(0.0447)	(0.0499)	(0.0552)	(3.354)	(2.680)
ΔDYG			1.373***	1.413***	27.48**	1.618
			(0.492)	(0.285)	(12.95)	(9.390)
ΔWYG	0.660	1.116***			9.004	25.62*
	(0.641)	(0.386)			(21.05)	(14.75)
ΔTOT					10.69	4.599
					(7.421)	(5.370)
ΔTRF	0.00970	-0.000756	0.00595	0.00844	-0.349	-0.231
	(0.0211)	(0.00492)	(0.00794)	(0.00758)	(0.481)	(0.206)
ΔLIB	-0.0594	-0.0170	-0.0478	-0.115*	1.824	1.401
	(0.0598)	(0.0397)	(0.0397)	(0.0620)	(2.321)	(2.287)
$\hat{\xi}_{t-1}$	-0.431***	-0.305***	-0.412***	-0.216***	-0.816***	-0.476***
	(0.0803)	(0.0517)	(0.0545)	(0.0390)	(0.0527)	(0.0566)
Constant	-2.676	3.001***	2.647	1.917***	114.2	261.6***
	(9.901)	(0.515)	(2.097)	(0.340)	(489.9)	(30.85)
Hausman test (χ_k^2)	1.33 (0.8571)		1.86 (0.7609)		2.57 (0.8611)	

Note: The null hypothesis for Hausman test is that the PMG estimator is the efficient estimator while the MG estimator is the efficient estimator under the alternative hypothesis. The value in parenthesis is standard error for the coefficients but p-value for Hausman test, while ***, ** and * denotes 1%, 5% and 10% levels of significance.

6. Conclusion

Motivated by poor showing of international trade activities in developing countries, this paper used the case of 19 select SSA countries to investigate the extent to which trade policies such as trade liberalisation and tariff rates matter for trade performance in SSA. Exploring a non-stationarity dynamics panel data estimators namely, MG and PMG, this study found that increasing tariffs have the potential to worsen the export growth performance in SSA particularly on the long run, but increasing openness via liberalisation policy is likely to spur declining import dependence of the region both on the short and long run. Thus, this study concluded that

while trade liberalisation may, at least, statistically exhibit no significant impact on the export growth performance of SSA, it can be explored to cause reduction in the region's import activities, particularly those import activities threatening the growth domestic industries.

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